

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
14 October 2004 (14.10.2004)

PCT

(10) International Publication Number
WO 2004/087229 A3

(51) International Patent Classification⁷: **A61L 24/04**,
27/50, 24/06

(21) International Application Number:
PCT/GB2004/001509

(22) International Filing Date: 5 April 2004 (05.04.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0307834.2 4 April 2003 (04.04.2003) GB

(71) Applicant (for all designated States except US): **TA CONTRAST AB** [SE/SE]; Lybska Vägen 10, SE-23940 Falsterbo (SE).

(71) Applicant (for GB only): **COCKBAIN, Julian** [GB/GB]; 42 Southmoor Road, Oxford OX2 6RD (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **ALMEN, Torsten** [SE/SE]; TA Contrast AB, Lybska vägen 10, SE-23940 Falsterbo (SE). **KLAVENESS, JO** [NO/NO]; TA Contrast AB, Lybska Vägen 10, SE-23940 Falsterbo (SE). **BRUDELI, Bjarne** [NO/NO]; TA Contrast AB, Lybska Vägen 10, SE-23940 Falsterbo (SE).

(74) Agents: **COCKBAIN, Julian** et al.; Frank B. Dehn & Co., 179 Queen Victoria Street, London EC4V 4EL (GB).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
17 February 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **BONE CEMENT COMPOSITIONS**

(57) Abstract: The present invention provides a bone cement comprising in admixture a monomer-containing liquid portion and a particulate polymer portion, characterized in that at least one of said portions comprises a dissolved nonpolymerizable organoiodine compound.

WO 2004/087229 A3

INTERNATIONAL SEARCH REPORT

Inter 1al Application No
PCT/GB2004/001509

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61L24/04 A61L27/50 A61L24/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99/62570 A (LIDGREN LARS AAKE ALVAR ; BONE SUPPORT AB (SE)) 9 December 1999 (1999-12-09) page 3, line 12 - line 34 claims 1,2,16	1,6-18, 40
X	US 6 040 408 A (KOOLE LEO HENDRIK) 21 March 2000 (2000-03-21) example 2 claims 1-5 ----- -/--	2,3, 6-17,19, 20,40

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

30 November 2004

Date of mailing of the international search report

07 12 04

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Heck, G

INTERNATIONAL SEARCH REPORT

Interr 1st Application No
PCT/GB2004/001509

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	VAZQUEZ B ET AL.: "Radiopaque acrylic cements prepared with a new acrylic derivative of iodo-quinoline" BIOMATERIALS, vol. 20, no. 21, November 1999 (1999-11), pages 2047-2053, XP002308104 cited in the application page 2048, right-hand column, paragraph 1 page 2049, left-hand column, paragraph 3 - page 2050, left-hand column, paragraph 2 -----	2,3, 6-17,19, 20,40
X	US 5 902 839 A (LAUTENSCHLAGER EUGENE P ET AL) 11 May 1999 (1999-05-11) claims 1-4,6-8 -----	4-17, 21-23
X	EP 0 676 212 A (SQUIBB BRISTOL MYERS CO) 11 October 1995 (1995-10-11) column 3, line 32 - line 43 -----	4,21

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2004/001509

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

Although claim 40 is directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the composition.
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

1-23, 40
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/SA/ 210

Continuation of Box II.1

Although claim 40 is directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the composition.

Continuation of Box II.1

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1, 18 (completely), 6-17, 40 (partially)

Bone cement comprising a liquid monomer portion, a particulate polymer portion and a dissolved non-polymerisable organoiodine compound.

2. claims: 2, 19 (completely), 3, 6-17, 20, 40 (partially)

Bone cement comprising a liquid monomer portion comprising a polymerisable organoiodine compound and a particulate polymer comprising covalently bonded residues of a polymerisable organoiodine compound.

3. claims: 3, 6-17, 20, 40 (partially)

Bone cement comprising a liquid monomer portion and a particulate polymer, the liquid portion comprising a polymerisable organoiodine compound and/or the polymer comprising covalently bonded residues of a polymerisable organoiodine compound, wherein said polymerisable organoiodine compound comprises an organoiodine moiety covalently bonded via an amide but not an ester bond to a polymerisable moiety.

4. claims: 4, 5, 21-23 (completely), 6-17 (partially)

Bone cement having a chemically homogenised distribution of all components therein.

5. claims: 24, 25, 36-39 (completely)

Organoiodine compound of formula IV.

6. claim: 26 (completely)

Method for producing a bone cement comprising admixing a liquid monomer portion and a particulate polymer portion under helium.

7. claims: 27-29 (completely), 32-35 (partially)

Method for preparing a particulate polymer of a bone cement, wherein the polymer particles are formed by emulsion polymerisation.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

8. claims: 30 (completely), 32-35 (partially)

Method for producing polymer particles by emulsion polymerisation, characterised in that salts are added to the aqueous phase.

9. claims: 31 (completely), 32-35 (partially)

Method for producing polymer particles by emulsion polymerisation, wherein the pH is adjusted by the addition of acids, bases or buffers.

10. claim: 41 (completely)

Bone cement characterised in that the ultimate tensile strength and ultimate strain are greater than 10% higher than Palacos® bone.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/GB2004/001509

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9962570	A	09-12-1999	SE 511087 C2 AT 281185 T AU 4664299 A EP 1079867 A1 SE 9801901 A WO 9962570 A1 US 6586009 B1	02-08-1999 15-11-2004 20-12-1999 07-03-2001 02-08-1999 09-12-1999 01-07-2003
US 6040408	A	21-03-2000	AT 186650 T DE 69513404 D1 DE 69513404 T2 DK 777503 T3 EP 0777503 A1 ES 2138231 T3 GR 3032594 T3 WO 9605872 A1	15-12-1999 23-12-1999 06-07-2000 20-03-2000 11-06-1997 01-01-2000 31-05-2000 29-02-1996
US 5902839	A	11-05-1999	CA 2284925 A1 EP 0971677 A1 WO 9824398 A1	11-06-1998 19-01-2000 11-06-1998
EP 0676212	A	11-10-1995	US 5538514 A AU 684898 B2 AU 1615695 A CA 2145483 A1 CN 1114178 A DE 69523203 D1 DE 69523203 T2 EP 0676212 A1 ES 2163470 T3 JP 3507181 B2 JP 8038588 A	23-07-1996 08-01-1998 19-10-1995 08-10-1995 03-01-1996 22-11-2001 11-07-2002 11-10-1995 01-02-2002 15-03-2004 13-02-1996